Texas Water Development Board

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TO: Board Members

THROUGH: Robert E. Mace, Deputy Executive Administrator, Water Science & Conservation

FROM: Larry French, Director, Groundwater Resources Division

DATE: July 11, 2012

SUBJECT: Update to Modeled Available Groundwater Values for Groundwater Management Area 1 for the Ogallala and Rita Blanca Aquifers

ACTION REQUESTED

No action requested.

BACKGROUND

Key background points are:

- Section 36.108 (d) of the Texas Water Code requires groundwater conservation districts within each groundwater management area to adopt desired future conditions. Section 36.108(o) of the Texas Water Code requires groundwater conservation districts to submit the adopted desired future conditions to the Texas Water Development Board (TWDB).
- Once desired future conditions are submitted, Groundwater Resources Division staff develops draft values of modeled available groundwater based on the desired future conditions. Modeled available groundwater is the estimated amount of groundwater that may be produced to achieve the desired future condition.
- Groundwater conservation districts are required to include the desired future condition(s) in their groundwater management plans and consider modeled available groundwater when issuing permits.
- Regional water planning groups are required to use modeled available groundwater volumes to determine water supply needs in their regions.
- No formal action by the Board is required on modeled available groundwater values. The Board requested the ability to review modeled available groundwater values prior to staff delivery of final values to groundwater conservation districts and regional water planning groups.

Staff sends draft modeled available groundwater reports to the groundwater conservation districts in the groundwater management area for review and comment. Once comments are received from the districts and addressed, staff brings the numbers to the Board for review. As requested by the Board, this review includes a side-by-side comparison of the modeled available groundwater with current state water plan groundwater availability numbers and estimates of current groundwater use, recharge, drainable water in place, and maximum sustainable pumping levels. If appropriate, new values of modeled available groundwater are also compared to previous values.

KEY ISSUES

An updated groundwater availability model (GAM) for the northern portion of the Ogallala Aquifer (developed by INTERA, Inc., as part of the regional water planning process) has been approved and released by TWDB staff. At the request of the groundwater conservation districts in Groundwater Management Area 1, the modeled available groundwater values have been re-evaluated using the new model (Attachment A).

For each desired future condition, Appendix A contains a summary of the modeled available groundwater values, the previous managed available groundwater values (based on the previous GAM), 2012 State Water Plan groundwater availability, estimated 2008 groundwater pumping, estimated recharge, estimated storage volume, two alternative estimates of drainable storage volume, and estimated maximum sustainable groundwater pumping. A brief explanation of how each of the estimates shown in Attachment A was developed is provided in Attachment B.

This recommendation has been reviewed by legal counsel and complies with applicable statutes and TWDB rules.

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Kenneth L. Petersen, General Counsel

Attachment A: Summary of Modeled Available Groundwater Values, 2012 State Water Plan Groundwater Availability, Estimated 2008 Groundwater Pumping, Estimated Recharge, Estimated Storage Volume, Estimated Drainable Storage, and Estimated Maximum Sustainable Pumping

Attachment B: Explanation of Terms Used in Attachment A

Attachment A
Summary of Modeled Available Groundwater, 2012 State Water Plan Groundwater Availability, Estimated 2008 Groundwater Pumping, Estimated Recharge, Estimated Storage Volume, Estimated Drainable Storage, and Estimated Maximum Sustainable Pumping

Groundwater Management Area 1−Ogallala/Rita Blanca aquifers[1]
All values in acre-feet per year except where noted

Year	Estimated Modeled Available Groundwater Values based on Desired Future Conditions	Estimated Managed Available Groundwater based on Desired Future Conditions[2]	Availability in 2012 State Water Plan	Estimated 2008 Groundwater Pumping	Estimated Recharge	Estimated Storage Volume (acre-feet)	Estimate of Drainable Water (acre-feet)		Estimated Maximum Sustainable Pumping
							25%	75%	
2010	3,666,259	3,364,389	3,253,275	1,901,090	233,024	247,333,136	61,833,284	185,499,852	106,649
2020	3,310,163	2,965,556	3,050,998						
2030	3,012,056	2,658,150	2,796,468						
2040	2,707,647	2,402,610	2,533,000						
2050	2,418,801	2,181,758	2,288,434						
2060	2,151,403	2,027,465	2,052,193						

1 Refer to Attachment B for explanation of terms.
2 These managed available groundwater values are provided for context and have been replaced by the modeled available groundwater values. Refer to TWDB Report GR-09-026 MAG issued June 24, 2011.

Attachment B
Explanation of Terms Used in Attachment A

Modeled Available Groundwater

This is the estimated amount of pumping necessary to achieve the adopted desired future condition(s). This is distinct from the previously used "managed available groundwater" in that it includes both permitted and exempt pumping. It is, therefore, equivalent to groundwater availability used in the regional water planning process.

2012 State Water Plan Groundwater Availability

This is the groundwater availability established in the 2012 State Water Plan. Methods to establish this number varied considerably across the state.

2008 Groundwater Pumping

This is the estimated amount of groundwater pumping as derived from the Water Use Survey.

Estimated Recharge

Recharge is the amount of water that infiltrates to the aquifer from precipitation falling on the outcrop (where the aquifer is exposed at land surface). These values represent the estimated average recharge to each of the aquifers in the management area. In areas with a groundwater availability model, the average estimated recharge over the historical period of the model was used, typically between 18 and 30 years.

Estimated Storage Volume and Estimated Drainable Water

Storage volume is the estimated amount of water stored within the pores of the rock formation(s) that make up the aquifer. Depending on the thickness and storage properties of the aquifer and the desired future condition, the storage volume can range from a similar magnitude to the annual availability in the aquifer to thousands of times greater than the availability. The estimates of storage volume can include water of highly variable quality.

Even under ideal conditions, it is not possible to completely capture all of the water stored within an aquifer. Due to this, a range between 25 percent and 75 percent of the storage volume is also included as an estimate of the amount of water that can be drained from the aquifer.

Estimated Maximum Sustainable Pumping

This is the estimated maximum rate of pumping that can be maintained indefinitely and eventually result in stabilized water levels. This does not take into consideration the cost associated with a certain level of pumping or possible impacts of pumping such as reduced water quality, decreased outflow to streams and springs, or land surface subsidence. For most areas with a groundwater availability model, staff made several 500-year simulations to determine the highest pumping rate that results in steady water levels by the end of the simulation. It is important to note that these estimates are considered preliminary in that the groundwater availability models were generally not designed to make this type of calculation. Consequently, there is significant uncertainty in many of these estimates.